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Research area: process aims

Pulp production / recovered paper treatment

Keywords:

stickies, screening, cleaning, flotation, filtration

Title:
Optimisation of screening and cleaning technology to control deinking pulp cleanliness

Background/Problem area

Adhesives from paper converting which come back to the paper mills within the recoverd paper grades lead to numerous “stickies” problems including deposits on the paper machine, visual defects in the paper and problems in the printing machines due to residual sticky specks. Despite considerable progress in deinking technology the stickies problems are far from being solved.
Indeed, due to their inherent physical properties, the solid adhesive particles, or “primary stickies” produced during the repulping of the recovered papers are very difficult to remove from the pulp even with the latest deinking technology. In addition some components of the adhesive material are soluble under conventional deinking conditions and contribute to increase the load of dissolved and colloidal material (DCM) in the process water, which is liable to form “secondary stickies”. There is a need for a useful complete strategy in stock preparation including all steps which are dedicated to stickys separation.

Objectives/Research results

The overall objectives of the project are to promote the understanding of the micro-process of pressure screening and to improve the stickies removal efficiency of the most common process steps in deinking lines. Important results are

- The DiMethylFormamide-extraction method was tested sucessfully and can be used especially for microstickies detection in pulp and water streams. The main result of testing mill samples was, that macrostickies >100µm are mostly lower than 5% of total stickies content.

- In the screening step simulation we have found that the pressure in the slots is normally to low for stickies fragmentation. But macrostickys with a particle size 2 or 3 times bigger than the slot width can pass the slots under normal conditions in screening. The time remaining for passing the slots is significantly bigger than the time of one pressure pulse by the rotor. The particle deformation of macrostickies in the slots was shown by real pictures from a high speed camera.

- The cleaning trials showed a very low efficiency in macrostickies removal. Trials to increase the density of macrostickys by adding mineral powder were not sucessfully because the size of the macrostickies (> 500µm) was to big for a significant change in density.

- Deinking flotation can remove especially smaller macrostickies with particle size lower than 1000 µm (measured by INGEDE method No. 4). Main parameters were the stock consistency and the amount of fatty acid. Deinking flotation had also a very good efficiency in the field of microstickies (particle size 5…100µm) which come especially from binders of printing inks or coatings but also from fragmented adhesives. Very good correlation between lab/pilot trials and mill flotation have been seen.

- Pressure filtration in a modified pressure screen was unable to remove microstickies from the circuit water. Microstickies are mainly a part of the fines and fillers fraction which can pass the holes or slots of the filter basket. But pressure filtration with hole-screens can be a useful tool for fiber recovery from the water loops.

Application/Economic benefits

The sticky induced costs in european paper mills which are using recoverd paper grades are at least 10 €/t paper production. That means approx. 2% of total return is lost because of stickies related production failures and quality losses. The paper production in Europe was approx. 90 Mio t in 2000, so the stickies induced costs can be calculated to 900 Mio €/year. The required equipment and chemical additives for common stickies prevention are not included in this calculation.
The findings developed in the different workpackages will be drawn together and analysed in order to define optimised strategies for the removal of stickies in the deinking lines and to establish guidelines for the development of new recycling friendly adhesives.

Project period: 1st May 2002 – 30th April 2005

Remarks

The project KEG QLK5-2001-00619 is supported by the European Commission.

Are you interested? Then send us this short description with your name and address via fax. The project manager will contact you afterwards.

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